

HISTORY OF THE TURNER ROAD PENSTOCK BRIDGE

Approximately two miles west of here a unique bridge built in the 1920s spanned the 11-foot-diameter flowline which crossed the fertile farmland west of the Grace Dam.

Turner, a small agricultural community located west of the town of Grace, was settled in the late 1890s. Originally known as China Flats, it was renamed Turner in 1900 when a school and post office were established.

The bridge provided a crossing point over the 11-foot-diameter wood stave flowline which conveys water approximately 4.5 miles between Grace Dam on the Bear River to the Grace Power Plant.

The original bridge was replaced in 2016 by the current structure, which used geosynthetic reinforced soil integrated bridge system (GRS-IBS) technology.

20TH CENTURY TECHNOLOGY

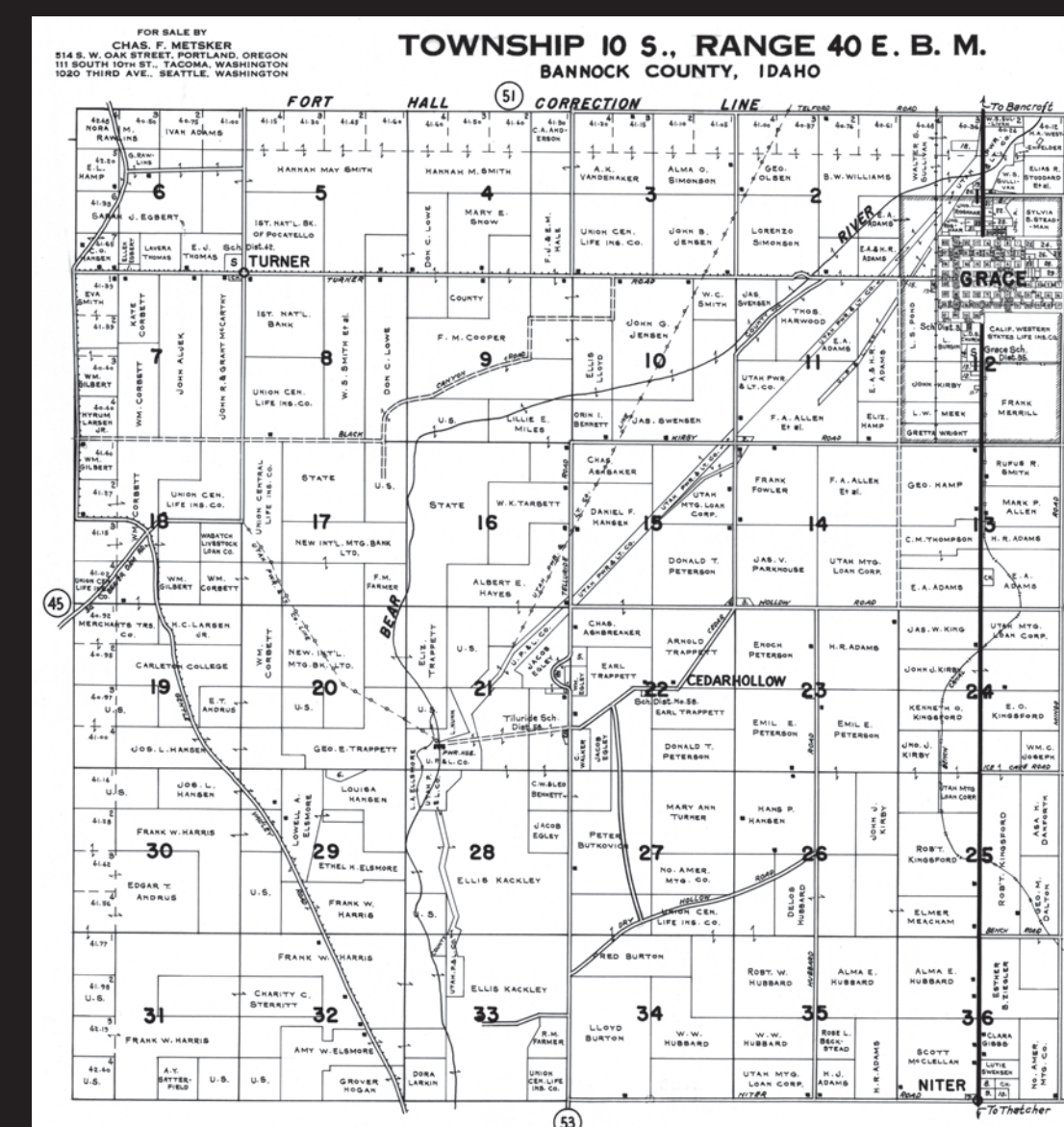
The original concrete and steel culvert bridge spanned two flowlines, an early woodstave flowline and its later replacement, from the Grace Dam. The early woodstave flowline was removed along with a riveted steel flowline that took a slightly different alignment between the Grace Dam and the powerhouse. It was constructed of two steel arch pipes on concrete and pile foundations. The roadway fill was contained over the arch pipes by concrete wing walls.



Few historic images of the Turner Road Penstock Bridge exist. This 1952 construction photo shows men standing on the bridge over the flowlines. (Image courtesy PacifiCorp).



Construction crew building four-mile long wood and steel flowline (penstock). November 2, 1907. (Image courtesy PacifiCorp).



Until 1948, Grace and the surrounding area including Gem, Gentile Valley, and Upper Portneuf were part of Bannock County as shown on this historic map. The residents voted to become part of Caribou County on January 11, 1948. (Map courtesy Metsker's Atlas of Bannock County, Idaho 1940/Historic Map Works).



This photo shows the Turner Bridge under construction over the flowline. The bridge abutments were built using GRS-IBS technology. Alternating layers of engineered backfill with sheets of geosynthetic reinforcement. Concrete was used for the bridge deck. (Image courtesy of LHTAC).

The bridge was considered a unique and efficient design. The arches, specifically designed to cross the flowlines, stood for decades. When the concrete wing walls deteriorated over time, it became necessary to replace them to protect the penstock below the bridge.

A NEW CENTURY AND NEW TECHNOLOGY

The reconstructed bridge represents new technology used for bridges across the United States. GRS-IBS is built by alternating layers of engineered backfill with sheets of geosynthetic reinforcement.

The U.S. Forest Service first used gravity walls in the 1970s to stabilize logging road embankments. Although GRS has been used in only the last few decades, the concept of reinforcing soil with organic materials has been around for thousands of years, dating back to straw and mud dwellings. GRS-IBS is adaptable to different site conditions and can be used for new or replacement structures with steel or concrete superstructures.

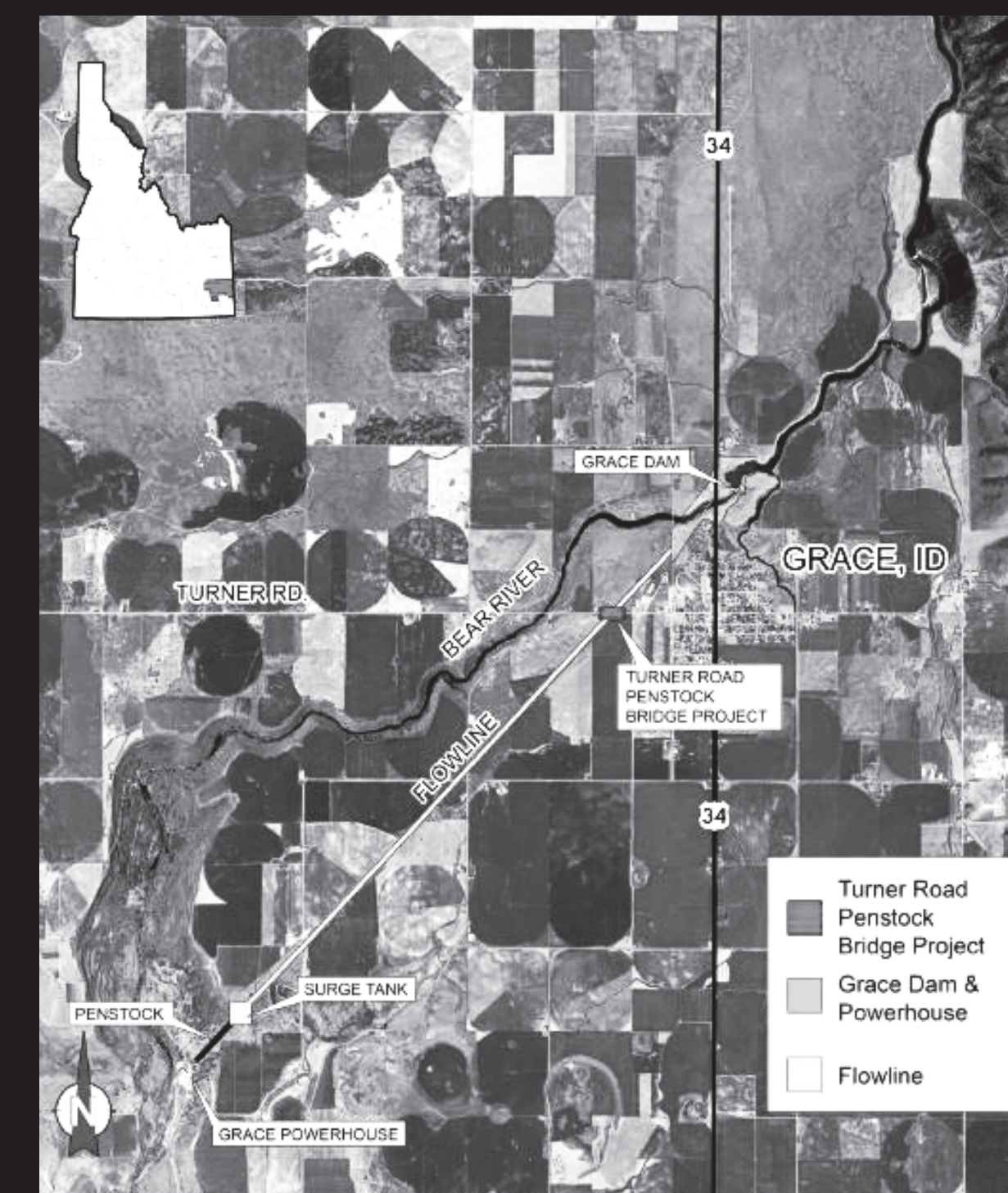


Image courtesy Taylor Planning.

WHAT IS A FLOWLINE?

A flowline is a pipeline that conveys water from a dam at lower pressures to a point where the pipe slope steepens to raise the water pressure enough to drive turbines in the powerhouse. The steeper section of pipe with higher pressure is called a penstock.